

What is claimed:

1. A method of forming a visual plot using a hierarchical structure of a dataset, wherein said dataset comprises a measure and a dimension, the dimension consisting of a plurality of levels, the plurality of levels forming a dimension hierarchy, the method comprising:

(A) constructing said visual plot based on a specification, wherein a first level from said plurality of levels is represented by a first component of said visual plot and wherein a second level from said plurality of levels is represented by a second component of said visual plot;

(B) querying said dataset to retrieve data in accordance with said specification, said data including all or a portion of said dimension and all or a portion of said measure; and

(C) populating said visual plot with said retrieved data in accordance with said specification, wherein

when said first component and said second component are each not an axis or a single layer of said visual plot, said first component is on a different layer or axis of said visual plot than said second component.

2. The method of claim 1 wherein said dataset is a database.

3. The method of claim 2 wherein said querying said dataset to retrieve data in accordance with said specification comprises querying the database to retrieve a set of tuples in accordance with said specification.

4. The method of claim 3 wherein said visual plot comprises a plurality of panes and said populating said visual plot with said retrieved data in accordance with said specification comprises associating all or a subset of said set of tuples with a pane in said plurality of panes.

5. The method of claim 4 the method further comprising encoding a tuple in said subset of tuples in said pane as a graphic.

6. The method of claim 1 wherein said specification is in a language based on the hierarchical structure of the dataset.
7. The method of claim 1 wherein said first component and said second component are not the same and said first component and said second component are each independently selected from the group consisting of one or more rows in said visual plot, one or more columns in said visual plot, one or more layers in said visual plot, an axis of said visual plot, a graphic in said visual plot, or a level of detail of a graphic in said visual plot.
8. The method of claim 7 wherein said first component is said plurality of rows and said second component is said plurality of columns.
9. The method of claim 8 wherein each row in said plurality of rows or each column in said plurality of column is assigned a different color or hash pattern.
10. The method of claim 8 wherein said first component is said plurality of rows and said second component is said plurality of layers.
11. The method of claim 10 wherein each row in said plurality of rows or each layer in said plurality of layers is assigned a different color or hash pattern.
12. The method of claim 8 wherein said first component is said plurality of columns and said second component is said plurality of layers.
13. The method of claim 12 wherein each column in said plurality of columns or each layer in said plurality of layers is assigned a different color or hash pattern.
14. The method of claim 1 wherein
  - a set of levels from said dimension are represented by said first component;
  - said set of levels represent a portion of the dimension hierarchy of the dimension; and
  - said plurality of levels do not include each level in said portion of the dimension hierarchy represented by said set of levels.

15. The method of claim 14 wherein said set of levels represent the levels month, quarter, and year and said set of levels consist of the levels month and year.
16. The method of claim 1 wherein  
a set of levels from said dimension are represented by said first component;  
said set of levels are represented in said first component of said visual plot in an order that deviates from an order in said dimension hierarchy.
17. The method of claim 1 wherein said retrieved data is represented in text form, as a bar chart, or as a scatterplot in said visual plot.
18. The method of claim 1 wherein said specification comprises an algebraic expression that includes an operand, wherein said algebraic expression represents an operation on said hierarchical structure of said dataset.
19. The method of claim 1 wherein  
said specification organizes said visual plot into a plurality of rows and a plurality of columns; and  
said specification comprises a first algebraic expression for said plurality of rows and a second algebraic expression for said plurality of columns and wherein at least one of said first algebraic expression and said second algebraic expression represents an operation on said hierarchical structure of said dataset.
20. The method of claim 19 wherein  
said specification further organizes said plurality of panes into a plurality of layers;  
said specification further comprises a third algebraic expression for said plurality of layers; and  
said third algebraic expression represents an operation on said hierarchical structure of said dataset.

21. The method of claim 1 wherein said first component of said visual plot is a first axis of said visual plot and said second component of said visual plot is a second axis of said visual plot.
22. The method of claim 21 wherein  
said first component represents a first level of said dimension hierarchy and a measure such that said measure is partitioned into a plurality of segments, each segment in said plurality of segments representing a data point in said first level; and  
said second component represents at least a second level of said dimension hierarchy.
23. The method of claim 21 wherein said dimension is time.
24. The method of claim 21 wherein each data point in said first level represents a predetermined time period.
25. The method of claim 24 wherein said predetermined time period is one of a year, a quarter, a month, a week, a day, an hour, a minute, or a second.
26. The method of claim 21 wherein each segment in said plurality of segments is assigned a different color or a different hash pattern.
27. The method of claim 1 wherein  
said first component represents a level of detail of a graphic,  
said second component is represented on a first axis, and  
said second axis represents a measure.
28. The method of claim 27 wherein said graphic is partitioned into a plurality of segments in accordance with said level of detail such that each segment of said plurality of segments is assigned a different color or a different hash pattern and each segment of said plurality of segments represents a different data point in the second level of said dimension hierarchy.

29. The method of claim 28 wherein said first level is year and said second component is month.

30. A computer program product for use in conjunction with a computer system, the computer program product comprising a computer readable storage medium and a computer program mechanism embedded therein, the computer program mechanism for forming a visual plot using a hierarchical structure of a dataset, wherein said dataset comprises a measure and a dimension, the dimension consisting of a plurality of levels, the plurality of levels forming a dimension hierarchy, the computer program mechanism comprising:

(A) instructions for constructing said visual plot based on a specification, wherein a first level from said plurality of levels is represented by a first component of said visual plot and wherein a second level from said plurality of levels is represented by a second component of said visual plot;

(B) instructions for querying said dataset to retrieve data in accordance with said specification, said data including all or a portion of said dimension and all or a portion of said measure; and

(C) instructions for populating said visual plot with said retrieved data in accordance with said specification, wherein

when said first component and said second component are each not an axis or a single layer of said visual plot, said first component is on a different layer or axis of said visual plot than said second component.

31. The computer program product of claim 30 wherein said dataset is a database.

32. The computer program product of claim 31 wherein said querying said dataset to retrieve data in accordance with said specification comprises querying the database to retrieve a set of tuples in accordance with said specification.

33. The computer program product of claim 32 wherein said visual plot comprises a plurality of panes and said populating said visual plot with said retrieved data in accordance with said specification comprises associating all or a subset of said set of tuples with a pane in said plurality of panes.

34. The computer program product of claim 33 the computer program mechanism further comprising instructions for encoding a tuple in said subset of tuples in said pane as a graphic.
35. The computer program product of claim 30 wherein said instructions for constructing comprise instructions for providing a specification that is in a language based on the hierarchical structure of the dataset.
36. The computer program product of claim 30 wherein said first component and said second component are not the same and said first component and said second component are each independently selected from the group consisting of one or more rows in said visual plot, one or more columns in said visual plot, one or more layers in said visual plot, an axis of said visual plot, a graphic in said visual plot, or a level of detail of a graphic in said visual plot.
37. The computer program product of claim 36 wherein said first component is said plurality of rows and said second component is said plurality of columns.
38. The computer program product of claim 37 wherein each row in said plurality of rows or each column in said plurality of column is assigned a different color or hash pattern.
39. The computer program product of claim 36 wherein said first component is said plurality of rows and said second component is said plurality of layers.
40. The computer program product of claim 39 wherein each row in said plurality of rows or each layer in said plurality of layers is assigned a different color or hash pattern.
41. The computer program product of claim 36 wherein said first component is said plurality of columns and said second component is said plurality of layers.

42. The computer program product of claim 41 wherein each column in said plurality of columns or each layer in said plurality of layers is assigned a different color or hash pattern.

43. The computer program product of claim 30 wherein  
a set of levels from said dimension are represented by said first component;  
said set of levels represent a portion of the dimension hierarchy of the dimension; and  
said plurality of levels do not include each level in said portion of the dimension hierarchy represented by said set of levels.

44. The computer program product of claim 43 wherein said set of levels represent the levels month, quarter, and year and said set of levels consist of the levels month and year.

45. The computer program product of claim 30 wherein  
a set of levels from said dimension are represented by said first component;  
said set of levels are represented in said first component of said visual plot in an order that deviates from an order in said dimension hierarchy.

46. The computer program product of claim 30 wherein said retrieved data is represented in text form, as a bar chart, or as a scatterplot in said visual plot.

47. The computer program product of claim 30 wherein said specification comprises an algebraic expression that includes an operand, wherein said algebraic expression represents an operation on said hierarchical structure of said dataset.

48. The computer program product of claim 30 wherein  
said specification organizes said visual plot into a plurality of rows and a plurality of columns; and  
said specification comprises a first algebraic expression for said plurality of rows and a second algebraic expression for said plurality of columns and wherein at least one of said first algebraic expression and said second algebraic expression represents an operation on said hierarchical structure of said dataset.

49. The computer program product of claim 48 wherein  
said specification further organizes said plurality of panes into a plurality of layers;  
said specification further comprises a third algebraic expression for said plurality of layers; and  
said third algebraic expression represents an operation on said hierarchical structure of said dataset.
50. The computer program product of claim 30 wherein said first component of said visual plot is a first axis of said visual plot and said second component of said visual plot is a second axis of said visual plot.
51. The computer program product of claim 50 wherein  
said first component represents a first level of said dimension hierarchy and a measure such that said measure is partitioned into a plurality of segments, each segment in said plurality of segments representing a data point in said first level; and  
said second component represents at least a second level of said dimension hierarchy.
52. The computer program product of claim 51 wherein said dimension is time.
53. The computer program product of claim 51 wherein each data point in said first level represents a predetermined time period.
54. The computer program product of claim 53 wherein said predetermined time period is one of a year, a quarter, a month, a week, a day, an hour, a minute, or a second.
55. The computer program product of claim 50 wherein each segment in said plurality of segments is assigned a different color or a different hash pattern.
56. The computer program product of claim 30 wherein  
said first component represents a level of detail of a graphic,



said second component is represented on a first axis, and  
said second axis represents a measure.

57. The computer program product of claim 56 wherein said graphic is partitioned into a plurality of segments in accordance with said level of detail such that each segment of said plurality of segments is assigned a different color or a different hash pattern and each segment of said plurality of segments represents a different data point in the second level of said dimension hierarchy.

58. The computer program product of claim 57 wherein said first level is year and said second component is month.

59. A computer system for forming a visual plot using a hierarchical structure of a dataset, wherein said dataset comprises a measure and a dimension, the dimension consisting of a plurality of levels, the plurality of levels forming a dimension hierarchy, the computer system comprising:

- a central processing unit;

- a memory, coupled to the central processing unit, the memory storing:  
said dataset;

- a programming module comprising:

- (A) instructions for constructing said visual plot based on a specification, wherein a first level from said plurality of levels is represented by a first component of said visual plot and wherein a second level from said plurality of levels is represented by a second component of said visual plot;

- (B) instructions for querying said dataset to retrieve data in accordance with said specification, said data including all or a portion of said dimension and all or a portion of said measure; and

- (C) instructions for populating said visual plot with said retrieved data in accordance with said specification, wherein

- when said first component and said second component are each not an axis or a single layer of said visual plot, said first component is on a different layer or axis of said visual plot than said second component.

60. The computer system of claim 59 wherein said dataset is a database.

61. The computer system of claim 60 wherein said querying said dataset to retrieve data in accordance with said specification comprises querying the database to retrieve a set of tuples in accordance with said specification.
62. The computer system of claim 61 wherein said visual plot comprises a plurality of panes and said populating said visual plot with said retrieved data in accordance with said specification comprises associating all or a subset of said set of tuples with a pane in said plurality of panes.
63. The computer system of claim 62 the programming module further comprising encoding a tuple in said subset of tuples in said pane as a graphic.
64. The computer system of claim 59 wherein said constructing comprises providing a specification that is in a language based on the hierarchical structure of the dataset.
65. The computer system of claim 59 wherein said first component and said second component are not the same and said first component and said second component are each independently selected from the group consisting of one or more rows in said visual plot, one or more columns in said visual plot, one or more layers in said visual plot, an axis of said visual plot, a graphic in said visual plot, or a level of detail of a graphic in said visual plot.
66. The computer system of claim 65 wherein said first component is said plurality of rows and said second component is said plurality of columns.
67. The computer system of claim 66 wherein each row in said plurality of rows or each column in said plurality of column is assigned a different color or hash pattern.
68. The computer system of claim 66 wherein said first component is said plurality of rows and said second component is said plurality of layers.

69. The computer system of claim 68 wherein each row in said plurality of rows or each layer in said plurality of layers is assigned a different color or hash pattern.

70. The computer system of claim 66 wherein said first component is said plurality of columns and said second component is said plurality of layers.

71. The computer system of claim 70 wherein each column in said plurality of columns or each layer in said plurality of layers is assigned a different color or hash pattern.

72. The computer system of claim 59 wherein  
a set of levels from said dimension are represented by said first component;  
said set of levels represent a portion of the dimension hierarchy of the dimension; and  
said plurality of levels do not include each level in said portion of the dimension hierarchy represented by said set of levels.

73. The computer system of claim 72 wherein said set of levels represent the levels month, quarter, and year and said set of levels consist of the levels month and year.

74. The computer system of claim 59 wherein  
a set of levels from said dimension are represented by said first component;  
said set of levels are represented in said first component of said visual plot in an order that deviates from an order in said dimension hierarchy.

75. The computer system of claim 59 wherein said retrieved data is represented in text form, as a bar chart, or as a scatterplot in said visual plot.

76. The computer system of claim 59 wherein said specification comprises an algebraic expression that includes an operand, wherein said algebraic expression represents an operation on said hierarchical structure of said dataset.

77. The computer system of claim 59 wherein

said specification organizes said visual plot into a plurality of rows and a plurality of columns; and

said specification comprises a first algebraic expression for said plurality of rows and a second algebraic expression for said plurality of columns and wherein at least one of said first algebraic expression and said second algebraic expression represents an operation on said hierarchical structure of said dataset.

78. The computer system of claim 77 wherein

said specification further organizes said plurality of panes into a plurality of layers;

said specification further comprises a third algebraic expression for said plurality of layers; and

said third algebraic expression represents an operation on said hierarchical structure of said dataset.

79. The computer system of claim 59 wherein said first component of said visual plot is a first axis of said visual plot and said second component of said visual plot is a second axis of said visual plot.

80. The computer system of claim 79 wherein

said first component represents a first level of said dimension hierarchy and a measure such that said measure is partitioned into a plurality of segments, each segment in said plurality of segments representing a data point in said first level; and

said second component represents at least a second level of said dimension hierarchy.

81. The computer system of claim 79 wherein said dimension is time.

82. The computer system of claim 79 wherein each data point in said first level represents a predetermined time period.

83. The computer system of claim 82 wherein said predetermined time period is one of a year, a quarter, a month, a week, a day, an hour, a minute, or a second.

84. The computer system of claim 79 wherein each segment in said plurality of segments is assigned a different color or a different hash pattern.
85. The computer system of claim 59 wherein  
said first component represents a level of detail of a graphic,  
said second component is represented on a first axis, and  
said second axis represents a measure.
86. The computer system of claim 85 wherein said graphic is partitioned into a plurality of segments in accordance with said level of detail such that each segment of said plurality of segments is assigned a different color or a different hash pattern and each segment of said plurality of segments represents a different data point in the second level of said dimension hierarchy.
87. The computer system of claim 86 wherein said first level is year and said second component is month.
88. The method of claim 2 wherein said querying said dataset to retrieve data in accordance with said specification comprises querying the database to retrieve a set of objects in accordance with said specification.
89. The computer program product of claim 30 wherein said querying said dataset to retrieve data in accordance with said specification comprises querying the database to retrieve a set of objects in accordance with said specification.
90. The computer system of claim 59 wherein said querying said dataset to retrieve data in accordance with said specification comprises querying the database to retrieve a set of objects in accordance with said specification.